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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,227	08/03/2006	Tetsuhiro Ishikawa	128935	5418

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EXAMINER

SLIFKA, COLIN W

ART UNIT	PAPER NUMBER
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1793

NOTIFICATION DATE	DELIVERY MODE
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06/22/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/588,227	Applicant(s) ISHIKAWA ET AL.	
	Examiner COLIN W. SLIFKA	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 March 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 6-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 6-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 2, and 6-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al (US 2002/0038732) in view of Peng (US 7,130,205) and further in view of Tsuchiya (JP 2003-235252).

Sugiura teaches a dc power supply using a fuel cell, wherein the fuel cell is connected to a rechargeable/dischargeable battery via a DC-DC converter (par. 7 and Fig. 1).

While Sugiura discloses that the output voltage of the DC-DC converter can be varied (par. 42), Sugiura does not teach that the converter comprises a plurality of phases.

Peng teaches that three-phase bridge converters are typical voltage converters used with batteries, fuel cell stacks, etc. (col. 1, lines 19-22). Traditional three-phase voltage converters include six switches, which are controlled by a control unit to provide a desired output (col. 1, lines 25-32). The invention of Peng includes a switch array that is controlled by a control unit to provide single or multiple phase power (col. 3, lines 65-67).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a three-phase bridge converter in the invention of Sugiura in order to be

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able to vary the phases and achieve the desired output, as Peng teaches that such converters are commonly used with fuel cells.

Neither Sugiura nor Peng explicitly describe a control method of the system incorporating varying the phases.

Tsuchiya teaches a method of operating a DC-DC converter, wherein a controller controls a "master" DC-DC converter and "slave" DC-DC converters on the basis of the requested output voltage from the inverter, the input-output current voltage information from the current/voltage sensors, the battery voltage information from the voltage sensor, and others (Abstract). More specifically, Tsuchiya teaches that the master DC-DC converter is made to "certainly drive," and performs adjustment of the number with slave DC-DC converters (par. 27, lines 2-3). The number, N, is a predetermined number based upon several calculations and determines the control method while maintaining maximum efficiency (pars. 21-26). Operation of the various DC-DC converters is based upon the value of the number, N (par. 27, lines 3-6).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the control method of Tsuchiya in the hybrid fuel cell system of Sugiura and Peng in order to optimize the operating efficiency where at least one to three different phases can be utilized based on need.

Regarding claims 7, 8, 11, and 12, Tsuchiya teaches that if $N=1$, only the master DC-DC converter will be in operation, and if $N=2$, both the master DC-DC converter 31 and the slave DC-DC converter 32 will be in operation, and finally, if $N=3$, the master

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DC-DC converter 31 and both of the slave DC-DC converters 32 and 33 will be operational (par. 27, lines 3-6).

With regards to claim 9, the fuel cell of Sugiura is considered to be connected to load equipment to power the vehicle. At the very least it would have been obvious to one of ordinary skill in the art at the time of the invention to connect the fuel cell to load equipment because that is how all fuel cells deliver the generated power.

Regarding claim 10, Peng uses the term “converter” to generally include DC-DC, AC-AC, AC-DC, and DC-AC converters (col. 3, lines 46-49). As such, the converter of Peng is capable of handling all types of current. It is assumed that any control method set by an operator or programmer would conduct the phase changes in a synchronized manner.

Response to Arguments

Applicant's arguments filed March 25, 2010 have been fully considered but they are not persuasive. Applicant argues that “the controller of Tsuchiya controls the operation of the DC-DC converters based on a desired output, rather than an actual power passing through the converter,” alleging that the control of the operation of the instant application is based on an “actual” power passing through the converter. It should be noted that the instant claims state that the controller changes the number of phases of operation of the voltage converter “in accordance with a value **equivalent to** power passing through the voltage converter.” As applicant is incorrectly arguing the claims, such an argument is moot. Even if the instant claims were drawn to the “actual

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power,” such an argument is not persuasive. While it is true that Tsuchiya teaches the controller 4 controls the DC-DC converters based on the demand output voltage from the inverter 2, Tsuchiya also teaches that controller 4 controls the converters based upon input/output current voltage information from current/voltage sensors 5 and 6, and battery voltage information, among others (as stated both above and in the prior action, as well as in Applicant’s Remarks filed March 25, 2010). Said current/voltage sensors are considered able to determine the power passing through the converters.

Furthermore, it is not clear to Examiner how determining "desired output" and sensing “actual power” is not essentially the same thing. The only reason one would want to know an actual value is to be able to determine the desired value, and vice versa.

Especially in such an invention as an automobile, one would not be able to determine desired values without actual real-time feedback from the system. In other words, operation on the basis of actual power is, in effect, to achieve a desired output, and operation based on desired outputs (which is really any/every operation) must be based upon real data (inputs).

Applicant argues that Tsuchiya does not teach the limitations of claim 11, that when the “equivalent value” is smaller than a “predetermined value,” the number of phases is fewer than when said “equivalent value” is equal to or greater than said “predetermined value.” Such an argument, with a lack of reasoning, is not clear to Examiner, nor is it persuasive, as Tsuchiya would appear to teach just that, as described both above and in the prior action. Tsuchiya teaches predetermined numbers which may “equal” 1, 2, and 3. Said numbers represent phases one, two,

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three, respectively. Now, 1 (single phase) is *less than* 2, which is *fewer* phases than when predetermined number is *equal to or greater than* 2 (multiple phases).

Applicant argues that the teachings of Tsuchiya fail to disclose the limitations of instant claim 12, which allow the system to avoid a "hunting phenomenon." The assertion that the equation of Tsuchiya causes said "hunting phenomenon" is not supported, and evidence or a Declaration will need to be submitted. Still, the operation taught by Tsuchiya, as described above, would seem to certainly avoid such a phenomenon. The operation described in claim 12 relies upon a "buffer zone" in order to overcome said "hunting." Wherein the points at which phases change from single to multiple phase drive modes consist of a minimum and a maximum, and a portion in between where operation remains stable. Regarding Tsuchiya's phases one and two, for example, Tsuchiya sets said minimum and maximum points at 1 and 2, respectively. If N equaled 1.5, for example, such a value would be considered to be within such a "buffer zone." Regardless, the "hunting phenomenon" described by Applicant is extremely well known and simplistic, and would be taught in any controls text book. It would have been completely obvious to one of ordinary skill in the art to program the controller to overcome such a well known phenomenon/problem. Finally, the apparatus of Sugiura, as combined with Peng and Tsuchiya, is considered able to be operated in any fashion, such as those of instant claims 11 and 12. It should be noted that method of control limitations do not limit the apparatus as claimed in instant claims 11 and 12.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to COLIN W. SLIFKA whose telephone number is (571)270-5830. The examiner can normally be reached on Monday-Thursday, 10:00AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melvin Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/COLIN W SLIFKA/
Examiner, Art Unit 1793

June 17, 2010

/Melvin Curtis Mayes/
Supervisory Patent Examiner, Art Unit 1793